School Administrators' Level Of Using Scientific Problem Solving Skills In Organisational Problems Based On The Views Of Inspectors

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ABSTRACT

This study was designed to identify high school administrators' level of using scientific problem-solving techniques in organisational problems based on inspectors' views. The population of the study was the inspectors working in the city of Kırklareli in 2014-2015 school year. No sampling method was used since the whole population was reached within the study. Survey model was adopted, and the "Scale of School Administrators' Level of Using Scientific Problem-Solving Processes and Techniques in Organisational Problems" developed by Sağır and Göksoy (2011: 1-11) in 5-point Likert type was used as the data-gathering instrument. The scale was adapted to the Kırklareli sample and the Cronbach's Alpha coefficient was 0,95. According to the findings, the inspectors stated that school administrators differed in their level of using scientific problem solving techniques in terms of various variables. In overall, the inspectors indicated that school administrators properly defined the organisational problems they encountered, but did not apply the solutions developed to solve these problems. The study suggests that in-service training should be organised to enable administrators to use the necessary techniques to solve organisational problems, and policies including requiring them to do a master's degree in areas that focus on these issues should be developed to enhance administrator effectiveness.

Key Words: Inspector, School Administrator, High School, Problem-Solving, Organisational Problems, Scientific Problem-Solving Processes and Techniques

INTRODUCTION

The concept of problem has many different definitions in the literature. According to Dewey, problem is "anything that confuses and challenges human mind, and obscures belief" (Gelbal, 1991: 167). For Morgan, problem is a conflict situation in which individuals face inhibition in achieving a goal (Morgan; 1999, p: 149). Bingham defines problem as an obstacle in front of individuals' strengths that they have to achieve a goal. (Bingham, 1998, p: 1, cited in Güner; 2013, p:1022). In the Turkish dictionary of Turkish Language Association, problem is accepted as an issue that needs to be searched, learned, analysed and solved (TDK, 1992, 1200).

Considering that the concept of problem is associated with trouble, individuals need to know problem-solving techniques. There is no absolute way of problem solving techniques, but it is known that there are different ways that take individuals to the solution (Gülşen & Turhan, 2015: 207-2016; Morgan; 1995, p: 149)

As in the past, people encounter problems in their lives and produce various alternatives to cope with these problems. People produce alternative techniques in their individual problems as well as organisational problems. Using scientific methods to solve problems, either individual or organisational, has now become more important.

Because various problems can also be encountered in educational organisations, scientific methods should be used in solving problems in educational institutions. Organisational goals in educational institutions cannot be expected to be achieved without solving the problems (Gülşen & Turhan, 2015: 207-2016; Sungur, 1992: 129).

In educational organisations, schools are systems that operate under public oversight and where students are taught in a programmed and systematic way by staff who are experts in their subject areas to achieve a set of educational goals (Ada & Ünal, 1999: 67). From the perspective of schools, a problem is a situation that inhibits, slows down or disrupts achieving the school aims. As the school administration starts trying to eliminate such obstacles, the problem-solving process begins. School administrators are expected to keep the individual-institution dimensions of the social system in balance with a sense of mission, and operationalize the elements around them for achieving the school aims. To do these, they should do their job effectively and perform successful administrative behaviours. However, they should not try to solve problems without gathering accurate, reliable and sufficient data on the problems. In all schools, problem-solving methods should be determined based on scientific criteria, and solutions should be implemented by using scientific methods. Using scientific problem-solving techniques to solve problems

is of great importance in high schools that have significant effects on the future of individuals, and it is perhaps more important in this level than it is in other levels of education. Solving problems in institutions that have an effect on individuals' future by using scientific techniques is closely related to the administrators in these institutions. For this reason, knowing the attitudes of high school administrators in scientific problems, and the ways they follow in solving organisational problems would enhance the success of these institutions. It was thought to be of significance to identify high school administrators' level of using scientific problem-solving techniques in organisational problems based on the views of inspectors who know them closely, inspect their work, and advise them as a professional coach for their professional development. In this regard, this study was designed to identify high school administrators' level of using scientific problem-solving techniques in organisational problems based on inspectors' views. The stages and techniques of problem solving should be firstly analysed to identify high school administrators' level of using scientific problem-solving techniques in organisational problems. Therefore, the stages of problem solving and scientific problem-solving techniques are explained in the following sections.

Stages of Problem Solving
To educate 21st century individuals who have adopted constant development as their philosophy of life, think analytically, have developed problem-solving and decision-making skills, are open and flexible to team work, seek information and can access to it, have high qualifications and try to develop themselves, believe, are assertive and confident, and have national and universal values, each school should be turned to a high-quality school. This requires changes that would improve education, and thus, the participation of families, school administrators and all other relevant members of the society in addition to students, and coordination of constant development efforts (Gülşen, 2003: 68-69). However, ensuring changes can reveal various problems. Problem situations are solved through certain stages. In the literature, these stages are briefly described as follows: (Büyüköztürk, 2013: 24-26; Gülşen & Turhan, 2015: 207-2016; Karasar, 2012: 29-30; Yıldız, 2003: 29):

1. Realisation and Definition of the Problem: Defining the problem is the first stage of the problem solving process. A realistic definition of the problem with all its aspects considering various variables is of great importance.
2. Analysing the Problem: The first task after realising the problem is fully analysing it before moving on to the solution stage. This analysis requires the limits, dimensions, reasons and necessities of the problem situation to be thoroughly analysed.
3. Developing Alternative Solutions: After analysing the problem, ideas and possibilities regarding the solution should be put forward. Here, it should not be forgotten that creative thinking is active. Possible solutions are offered after revising the information related to the problem, and the appropriate solution is aimed to be found by examining the positive and negative aspects of these solutions.
4. Implementing the Solution Chosen: One of the importance aspects of solving the problem is the process of applying the solution for the problem. This process should be carefully followed, and whether the solution yielded the desired results should be monitored.

5. Evaluation the result: To identify the effectiveness of the solution and whether new problems have arisen, the results should be evaluated in a realistic way. For the evaluation to be successful, it should have standards.

Problem Solving Techniques
There is no absolute way of solving problems. There are various alternatives that exist and are tested to solve problems. Solving problems in accordance with scientific principles and effectively is a kind of art. Many techniques are used in solving problems, either individual or organisational. School administrators are expected to use these scientific techniques in solving organisational problems. These techniques are usually divided into six groups: "a)*Techniques for producing ideas, b)Constant development techniques, c)*Problem analysis techniques, d)Techniques for prioritising suggestions/reasons, e)Decision-making techniques and f)Data gathering, data analysis and evaluation techniques". Some of these techniques are described below (Arcaro, 1995: 108; Çalık, 2003: 178; Çetin, Akın & Erol,1998: 339; De Bono; 2008: 1-20; Efil, 1999: 202; Erdoğan; 2000: 27; Ernest, 1992: 143; Gülşen, 2000: 44-53; Gülşen & Turhan, 2015: 207-2016; Ishikawa, 1997: 142; Koray, 2004: 3; Langfort & Cleary, 1995: 96, 177; Schermerhorn, 1989: 142; Turhan, 2015: 24-50; Yüksel, 2004: 1).
  a) *Techniques for Producing Ideas* 1. Brainstorming Technique, 2. Six Thinking Hats, 3. Power Field Analysis, 4.Focus Groups, 5. Interview,
  b) Constant Development Techniques 1. Plan-Do-Check-Act (PDCA) Cycle, 2. Wh questions technique,
  c) Problem Analysis Techniques 1. Flow Diagram, 2. Fishbone, 3. Pareto Analysis, 4. Decision Analysis, 5. Affinity Diagram, 6.Time Sheets, 7. Force/Power Field Analysis,
  d) Techniques for prioritising Suggestions/Reasons: 1. Affinity Diagram, 2.Priorities Matrix/Effectiveness Analysis (Matrix Diagram),
  e) *Decision-Making Techniques*: 1.Nominal Group Technique. 2.Priorities Matrix/ Effectiveness Analysis, 3.Multiple Voting Technique, 4.Benchmarking

f) *Data Gathering, Data Analysis and Evaluation Techniques*: 1.Pareto Diagrams, 2.Survey, 3.Teamwork, 4.SWOT Analysis, 5.Similarity Diagram. 6.Affinity Diagram, 7.Control Schema, 8.Histogram, 9.Scatter Plot, 10.Timetable, 11.Control Tables.

In the scope of this study, not all the techniques were included in the evaluation. Some of the scientific problem-solving techniques were considered in the evaluation. The scientific problem-solving techniques that were included in the evaluation and questioned within the study are presented in Table 2.

METHOD
Research Design
In general, survey model was used in the study. It was designed to identify inspectors' views on high school administrators' level of using scientific problem-solving techniques in organisational problems.

Population and Sample
The population of the study consisted of all the inspectors working in the Department of School Inspectors in the city of Kırklareli in 2014-2015 school year. No sampling method was used since the whole population was reached within the study. 78,57% of the surveys distributed to the participants were returned and included in the evaluation.

Data Gathering, Analysis and Interpretation
In the study, literature review was firstly conducted, and then the views were identified through a scale. Survey model was adopted, and the "Scale of School Administrators' Level of Using Scientific Problem-Solving Processes and Techniques in Organisational Problems" developed by Sağır and Göksoy (2012: 1-11) in 5-point Likert type was used as the data gathering instrument. The scale was adapted to the Kırklareli sample and the Cronbach's Alpha coefficient was 0,95. The weights assigned to the extent of agreement for the propositions in the scale and the limits of these weights are as follows: "Never: 1.00-1.80", "Rarely: 1.81-2.60", "Sometimes: 2.61-3.40", "Usually: 3.41-4.20", "Always: 4.21-5.00".

In data analysis, SPSS was used, statistical analyses were performed, and frequencies, percentages and arithmetic means were determined. To determine the relationship between the level of using scientific problem-solving method and the administrators' experience, Kruskal Wallis Test was performed. Since all of the inspectors participated in the study were male, no evaluation could be done based on the gender variable, and the evaluation results based on experience was interpreted by means of the tables.

FINDINGS AND INTERPRETATION
In this section, the data obtained related to the inspectors' views on the school administrators' level of using scientific problem-solving processes and techniques were interpreted by the help of the statistical information presented in tables. In the interpretation of the data, package programs were used in the computer environment. The tables formed by the help of the data obtained, and the evaluations based on the data in the tables are presented below. The data related to the inspectors' views were firstly tabulated, and the frequencies, standard deviations and arithmetic means are presented in Table 1.

Table 1. Data Related to the Inspectors' Views on High School Administrators' Level of Using Scientific Problem-Solving Processes in Organisational Problems

No	"School Administrators ...."	Never	Rarely	Sometimes	Usually	Always	$\overline{\chi}^*$
		%	%	%	%	%	
1	Define organisational problems.	0	0	9,10	45,45	45,45	**4,36**
2	Identify solution alternatives for organisational problems.	0	0	45,45	54,55	0	**3,55**
3	Choose the most suitable possible solution for organisational problems.	0	9,10	0	90,90	0	**3,82**
4	Take into account the importance of the chosen solution for the school/organisation.	0	0	45,45	9,10	45,45	**4,00**
5	Do planning for implementing the solutions for organisational problems.	0	0	54,55	9,10	36,37	**3,82**
6	Implement the solutions developed for solving organisational problems.	0	81,82	9,10	9,10	0	**2,27**
7	Are creative in solving organisational problems.	0	9,10	36,37	54,55	0	**3,45**
8	Consider the contribution of the solution to the school community.	0	27,27	27,27	0	45,45	**3,64**
9	Prepare reports of the practices implemented in the problem-solving process.	0	0	3637	54,55	9,10	**3,73**
10	Evaluate the problem-solving process.	0	0	27,27	54,55	18,18	**3,91**
	General Arithmetic Mean						**3,65**

* "Never: "Never: 1.00-1.80", "Rarely: 1.81-2.60", "Sometimes: 2.61-3.40", "Usually: 3.41-4.20", "Always: 4.21-5.00"

The inspectors agreed on the propositions related to the high school administrators' level of using scientific problem-solving processes in organisational problems at the level of "usually" with a mean of $\overline{\chi}$=3,65. When the agreement levels were examined based on the propositions, it was found that the inspectors thought that the high school administrators always defined organisational problems. The proposition on which the inspectors had the highest agreement rate was "School administrators defined organisational problems". The inspectors agreed on this proposition at the level of "always" with an arithmetic mean of $\overline{\chi}$=4,36. The proposition on which the inspectors had the lowest agreement was "They apply solutions to solve organisational problems" at the level of "rarely" with an arithmetic mean of $\overline{\chi}$=2,27. It can be argued that based on the inspectors views, the school administrators were able to define organisational problems, but could not apply the solutions developed to solve organisational problems. The inspectors perceived the high school administrators as mostly sufficient in "identifying solutions for organisational problems, choosing the most suitable possible solution in organisational problems, considering the importance of the solution for the school/institution, making plans to apply the solution for organisational problems, being creative in the solution of organisational problems, considering the contribution of the solution to the school community, reporting the works implemented during the process of solving the problem, and evaluating the process of solving the problem".

Table 2. Kruskal Wallis Test Results Between the Inspectors' Scores Regarding Their Views on High Sool Administrators' Level of Using Scientific Problem-Solving Processes in Organisational Problems, and Their Experience

No.	"School Administrators ...."	Chi-Square	df	Significance (Asymp.Sig).
4	Take into account the importance of the chosen solution for the school/organisation.	9.220	4	,056

A significant different was found only in the proposition "They take into account the importance of the chosen solution for the school/organisation." between the inspectors' views on the high school administrators' level of applying scientific problem solving processes in organisational problems, and the experience variable. No significant differences could be found for other propositions.

In this section of the study, the inspectors vies on the scientific problem-solving techniques that high school administrators use in organisational problems, and interpretations regarding these views are presented.

Table 3. Data Related to the Inspectors' Views on Using Scientific Problem-Solving Techniques That High School Administrators Use in Organisational Problems

No.	Scientific problem-solving techniques that school administrators use in organisational problems "In solving organisational problems, school administrators ……………"	Never	Rarely	Sometimes	Usually	Always	$\overline{\chi}$*
		f	f	f	f	f	
1	Use the cause-effect diagram technique.	0.00	0.00	72.73	9.10	18.18	3.45
2	Use the tree diagram technique.	0.00	0.00	45.45	45.45	9.10	3.64
3	Use the Six Thinking Hats technique	0.00	0.00	54.55	45.45	0.00	3.45
4	Use the survey technique.	0.00	27.27	45.45	18.18	9.10	3.09
5	Use the brainstorming technique.	0.00	0.00	18.18	45.45	36.37	4.18
6	Use the 5N1K (wh questions) technique.	0.00	0.00	18.18	72.73	9.10	3.91
7	Use the similarity diagram technique.	0.00	0.00	36.37	63.64	0.00	3.64
8	Use the force-field analysis technique.	0.00	0.00	9.10	54.55	36.37	4.27
9	Use the relationship diagram technique.	0.00	0.00	18.18	63.64	18.18	4.00
10	Use the nominal group technique.	0.00	54.55	36.37	9.10	9.10	2.73
11	Use the case study technique.	0.00	0.00	36.37	63.64	0.00	3.64
12	Use the team work technique	0.00	0.00	0.00	54.55	45.45	4.45
13	Use the PDCA cycle.	0.00	0.00	54.55	45.45	0.00	3.45
14	Use the SWOT analysis technique.	0.00	0.00	0.00	100.00	0.00	4.00
15	Use the Pareto diagram technique.	27.27	54.55	0.00	18.18	0.00	2.09
General Arithmetic Mean							**3.60**

* "Never: "Never: 1.00-1.80", "Rarely: 1.81-2.60", "Sometimes: 2.61-3.40", "Usually: 3.41-4.20", "Always: 4.21-5.00"

As is seen in Table 3, the inspectors agreed on the propositions related to the scientific problem-solving techniques that high school administrators use in organisational problems at the level of usually with an arithmetic mean of $\overline{\chi}=3,60$. Based on this result, it can be stated that high school administrators mostly used scientific problem-solving techniques in organisational problems they encounter according to the views of the inspectors. According to the inspectors, high school administrators use the teamwork technique at most in terms of the arithmetical means in solving organizational. According to the inspectors, high school administrators use the teamwork technique in solving organisational problems at the level of always with an arithmetic mean of $\overline{\chi}=4,45$. The inspectors also stated that the least used technique by the high school administrators in organisational problems is the Pareto diagram technique. According to the inspectors, high school administrators use the Pareto diagram rarely in organisational problems. As for the rest of the problem solving techniques, they are used by the high school administrators in varying levels.

Table 4. Kruskal Wallis Test Results Between the Inspectors' Scores Regarding Their Views on High School Administrators' Level of Using Scientific Problem-Solving Techniques in Organisational Problems, and Their Experience

No	Scientific problem-solving techniques that school administrators use in organisational problems "In solving organisational problems, school administrators ……………"	Chi-Square	df	Significance (Asymp Sig)
1	Use the cause-effect diagram technique.	9.521	4	,049
6	Use the 5N1K (wh questions) technique.	10.060	4	,039
12	I use the team work technique	13.645	4	,009

A significant difference was found between the inspectors' views on high school administrators' level of applying scientific problem solving processes in organisational problems, and the techniques of cause-effect diagram, wh questions and teamwork in terms of the experience variable. No significant differences were revealed apart from the these three techniques.

RESULTS AND SUGGESTIONS
Findings:
The following results were revealed based on the findings:
1. Based on the inspectors views, the school administrators were able to define organisational problems, but could not apply the solutions developed to solve these problems.
2. The inspectors stated that high school administrators mostly used scientific problem-solving techniques in organisational problems they encounter.
3. The inspectors also indicated that the most used technique by the high school administrators was teamwork while the least used one was the Pareto diagram technique.
4. A significant different was found only in the proposition "They take into account the importance of the chosen solution for the school/organisation." between the inspectors' views on the high school administrators' scientific problem solving processes in organisational problems, and the experience variable, whereas no significant differences were found between the views in terms of other processes.
5. A significant difference was found between the inspectors' views on high school administrators' level of applying scientific problem solving processes in organisational problems, and the techniques of cause-effect diagram, wh questions and teamwork in terms of the experience variable. No significant differences were revealed between the views on levels of applying other techniques.

Suggestions
The following suggestions can be offered based on the results of the study:
1. Considering that high school administrators could identify organisational problems, but could not apply solutions, a set of academic trainings including in-service trainings to enable high school administrators to apply problem solving techniques and solutions should be organised.
2. It would be of significance to reach other stakeholders (e.g. inspectors, teachers, students and parents), obtain their views and make comparisons with the results in this study.

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